Unit 17 Denmore Industrial Estate, Denmore Road, Bridge of Don, AB23 8JW

User Manual

Hydraulic Drive
Wet Centre Reel

Part Nos 951-4500-HV0 thru 951-4506-HV0

Revision History

Issue, Date	Remarks
Rev A, 27 Mar. 12	Initial Issue

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Safety

WARNING: Trapped air requires considerable time to compress and when it is compressed is highly dangerous. Ensure that all trapped air is removed before pressure testing.

WARNING: The operator is to stop the operation of the equipment immediately if any unusual noises are heard or if the equipment operation appears laboured or tight.

Do not operate this equipment if hoses or fittings are damaged.

Unspool at least 50% of the hose when pressure testing to full working pressure. This will avoid the crushing of the inner coils of the hose due to hose expansion.

All pressure equipment has a particular pressure rating and care must be taken to ensure that no item is used in a situation that may cause its working pressure to be exceeded.

All personnel involved in pressure testing must be formally trained, competent and utilise the appropriate PPE.

This equipment and the equipment it is attached to is heavy, never position yourself below a suspended load.

Before attempting to spool hoses or wire ensure that the reel is securely fitted in place.

1 Introduction

1.1 General

The Phuel wet centre reel, for incorporation into wire-line units, allows hoses to be spooled while maintaining the hydraulic connection through the spindle. This Version uses a hydraulic motor drive assembly.

This user manual serves as a top level description of the basic installation and operation of the reels. A more detailed Illustrated Parts Catalogue (IPC) for each reel contains the relevant specifications, operation, planning and maintenance instructions, parts list and drawings for that specific part number.

1.2 Product Identification

Phuel products are identified by a unique serial number that facilitates full product traceability. Each product is supplied with a documentation pack that contains product certification and material/inspection reports. The serial number is always etched on the surface of the product. A customer identification number, if requested, is also included to allow the customer to track the asset in their system.

Each reel will be stamped at either end on the Spool Ends with the following information:

PHUEL OIL TOOLS
PART No 951-4XXX-HV0
SERIAL No XXX-XXX
SKID No - REEL No
MWP X,XXX PSI/ XXXX BAR
MTP X,XXX PSI/ XXXX BAR

This information should be located in the first instance to ensure that the manual issued refers to the correct equipment

1.3 DECLARATION OF CONFORMITY

DECLARATION OF CONFORMITY

Phuel Oil Tools Limited hereby declare that the following devices

Hydraulically Powered Wet Centre Reels

Model No. 951-4500-HV0 5,000 psi (345 Bar)

Model No. 951-4501-HV0 18,000 psi (1242 Bar)

Model No. 951-4502-HV0 18,000 psi (1242 Bar)

Model No. 951-4503-HV0 5,000 psi (345 Bar)

Model No. 951-4504-HV0 5,000 psi (345 Bar)

Model No. 951-4505-HV0 145 psi (10 Bar)

Model No. 951-4506-HV0 Wire Only

Also described as ;

A series of devices that permit hydraulic hoses to be spooled while maintaining hydraulic connection through the spindle. There are many applications for these devices including pressure testing and providing hydraulic power to remote actuators.

These devices were found to be in accordance with;

The European Machinery Directive 98/37/EC being implemented in the United Kingdom by the Supply of Machinery (Safety) Regulations 1992 and as amended by S.I. 1992/3073, S.I 1994/2063 and SI 2005/831

And the;

The European Directive on Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres 94/9/EC, being implemented in the United Kingdom by The Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 1996 (SI 1996/192) and as amended by The Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres (Amendment) Regulations 2001 (SI 2001 No.3766).

DECLARATION OF CONFORMITY

These devices were designed to meet with the following European Harmonised Standards;

BS EN ISO 12100 Part 1 Safety of Machinery. Basic concepts, general principles for design
BS EN ISO 12100 Part 2 Safety of Machinery. Technical principles
BS EN 13463 Part 1: Non-electrical Equipment intended for use in potentially explosive atmospheres - Basic Method and Requirements.
BS EN 13463 Part 5: Non-electrical equipment intended for use in potentially explosive atmospheres - Protection by constructional safety c.
BS EN 982 Safety of Machinery – Safety Requirements for Fluid Power Systems and Their Components – Hydraulics
BS EN 983 Safety of Machinery – Safety Requirements for Fluid Power Systems and Their Components - Pneumatics
BS EN 1050 Safety of Machinery – Principles for Risk Assessment

These devices have been classified as suitable for use within a potentially explosive atmosphere as follows.

CE Ex **II 2 G c T4**

I hereby declare that the devices described in this document have been designed and manufactured in compliance with the relevant sections and essential health and safety requirements of the aforementioned Standards, Codes and Directives / Regulations.

Name Colin McCracken Position Managing Director

Signed:

14th March 2012

2 Technical Description

2.1 Description

The compact Phuel wet centre reel is designed to allow the hoses to be spooled while maintaining hydraulic connection through the spindle. The hydraulic inlet connection is on the manifold, which is fixed to the ported spindle. Seals in the hub maintain the fluid pressure while the hub, reel ends and hose support bars turn.

This reel is controlled by an internal hydraulic driven motor, that drives the hub while spooling to allow safe and easy two-handed spooling operations. The speed of the motor is determined by the hydraulic flow rate and the maximum torque by the fluid pressure, to provide maximum control when spooling the hose.

The reel is unspoiled simply by pulling out the hose – there is no need to use the hydraulic motor for this but the fluid must be able to escape from the motor for smooth operation.

2.2 Connecting the Supply

The supply connection is located on the single manifold. The connections are as listed within the reel technical specification document

2.3 Connecting the Hydraulic Drive Supply

The motor connection is either located on the end sub of the reel or on the motor itself. The hydraulic motor requires a regulated pressure between 100-125 bar for optimum operation. The pressure determines the available torque delivered to the reel. The rotational speed of the reel is determined by the flow rate supplied to the motor.

There is usually need to regulate the hydraulic pressure while spooling as sufficient control can be achieved by gripping down on the hose. The speed and maximum torque should be set for safe operation while spooling the hose. A ball valve or foot pedal can be used to switch on the reel. Another valve can be used on the fluid exit line to act as a brake when the reel is not being used. (See Figure 1: Hydraulic Schematic Layout)

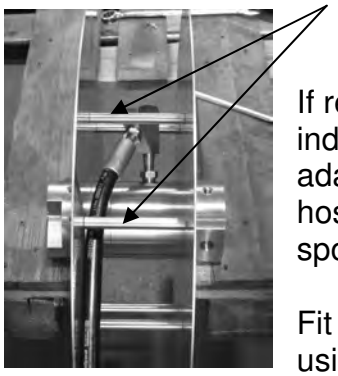
3 Operation

All operations to be carried out by suitably qualified and competent personnel

Prior to any spooling operations ensure the Wet Centre Reel is secured in place

When spooling the hose always wear gloves to prevent friction burns or cuts from debris attached to the hose.

3.1 Spooling the Hose



If required, disconnect and remove the 2 drum rods indicated in the picture and connect the hose to the adaptor. Refit the 2 rods over the hose making sure the hose exits the reel between the 2nd and 3rd rod to allow spooling.

Fit the motor assembly to the reel and secure in place using the quick release pin.

With one hand gripping the hose tightly, press the foot valve to start the motor. Gently relax your grip and allow the motor and reel to take the tension and start spooling – the speed of the spooling process can be controlled by adjusting the grip on the hose. Use your other hand to guide the hose onto the reel so that the first wrap is neat taking care not to trap fingers and clothing below the hose. Spool the hose slowly to achieve a neat wrap with no gaps – if gaps occur stop the motor, spool back and start again.

At the end of the first layer allow the hose to naturally reverse the wrapping direction and start the second layer try to pick up the grooves from the first layer as these will provide a guide for the rest of the spooling.
At the end of the second layer again allow the hose to reflect naturally from the first hose turn to start the third layer continue this process until the final layer is reached. At this point look at the end of the hose and determine when the end will arrive so that it does not pull through your hand.

3.2 Unspooling the Hose

Free the end of the hose and ensure that any braking mechanism (or switches) has been disabled.

Grab the end of the hose and pull from the reel. The reel will simply turn to allow the hose to be removed.

3.3 Hydraulic Operation

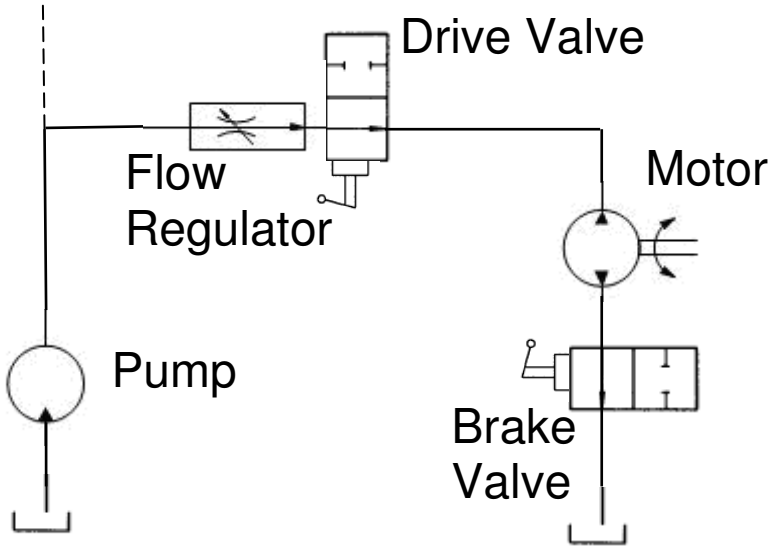


Figure 1: Hydraulic Schematic Layout

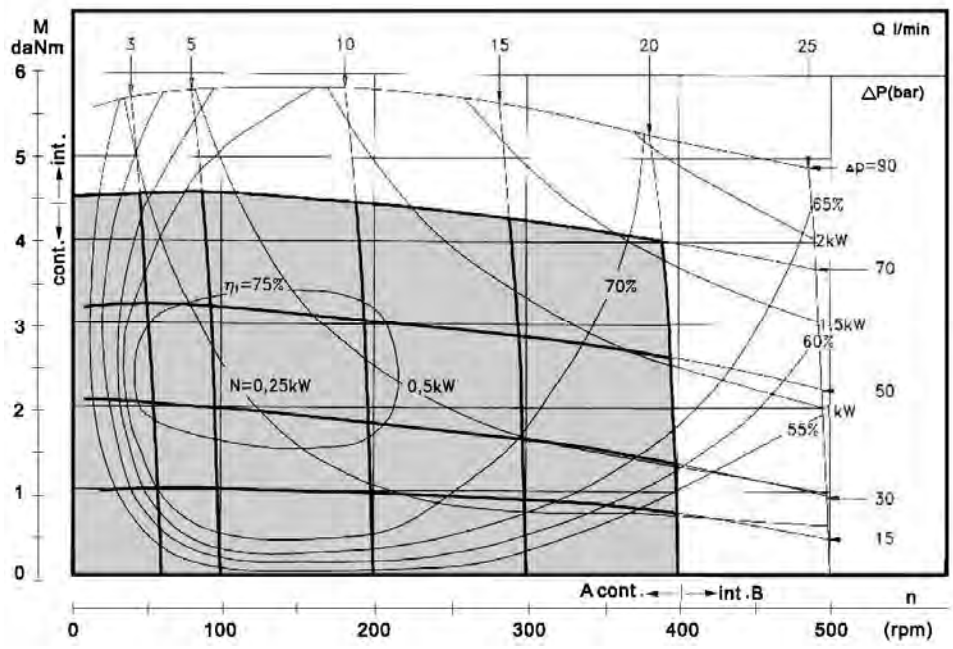


Figure 2: Hydraulic Motor Operational Parameters

4 Maintenance

All maintenance to be carried out by suitably qualified and competent personnel

4.1 Introduction

Regular maintenance of the equipment using Phuel redress kits or Phuel approved parts is essential to its continued safe operation. Ensure that the pre and post job operating procedures are followed and that maintenance records are kept.

4.2 Schedule

The maintenance schedule may be governed by international or company standards and the following is considered to be the minimum requirements.

4.2.1 Yearly

- Disassemble Wet Centre Reel (see technical data sheet) clean and degrease all components
- Inspect the condition of all sealing surfaces
- Replace all elastomeric seals with items from redress kit.
- Re-assemble (see technical data sheet)
- Pressure test to maximum working pressure in accordance to testing procedure (see Section 5)

4.3 Motor Maintenance

There is no Scheduled maintenance required for the motor

4.4 Safety

- Many of the components are heavy and should not be lifted without lifting aids.
- Ensure all pressure testing is carried out in the appropriate testing area by suitably qualified personnel.
- Wear appropriate personal protective equipment.
- Do not over exert yourself while using torque wrenches. Use appropriate mechanical advantages when available.
- Ensure that all tools and equipment are in good condition and are suitable for the intended use.
- Clear up any fluid spills immediately to avoid slips.

4.5 Assembly/Disassembly

For assembly and disassembly procedure refer to the individual reel technical document

4.6 Storage

To prolong the life of this equipment and help maintain it in good working order when not in use this equipment should be stored in a clean sheltered environment away from adverse weather conditions.

4.7 Maintenance Record Sheet

Date Performed	Type of Maintenance	Performed By	Verified By	Comments

Example

Table 1: Maintenance Record

5 Testing

All testing to be carried out in a designated test area by suitably qualified and competent personnel

WARNING: Trapped air requires considerable time to compress and when it is compressed is highly dangerous. It has enough stored energy to separate parts with considerable force.

- Unspool at least 50% of the hose from the reel
- Connect fluid pump to the manifold and fill the reel and hose until the test fluid is pumping through
- Blank off the hose outlet
- Apply low pressure and hold for 5 minutes. Ensure no leaks then bleed off the pressure.
- Apply pressure equivalent to Maximum Working Pressure (refer to IPC), allow to stabilise and hold for 5 minutes, bleed pressure and re-pressurise and hold for a further 15 minutes, ensure no leaks.
- Bleed off pressure and drain test fluid.

On completion of all maintenance ensure the maintenance record sheet (Section 4.7) is completed.

Refer to the relevant Illustrated Parts Catalogue for further specific information.

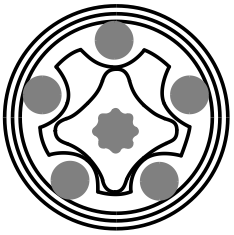
Appendix – Motor Specification

Manufacturer's document attached

maxima®

Hydraulic motor
Series MAMM

These units provide high output torque from a very small package.
The motors are available in displacement from .50 in.^{3}/rev. [8.2 cm^3 /rev.] to 3.05 in.^{3}/rev. [50 cm^3 /rev.]
The MAMM motors are fixed displacement, gerotor type units that are know for compactness and economy.
All MAMM motors have built-in check valves assuring pressure on the shaft seal never exceeds pressure levels seen in the return line.



Specifications

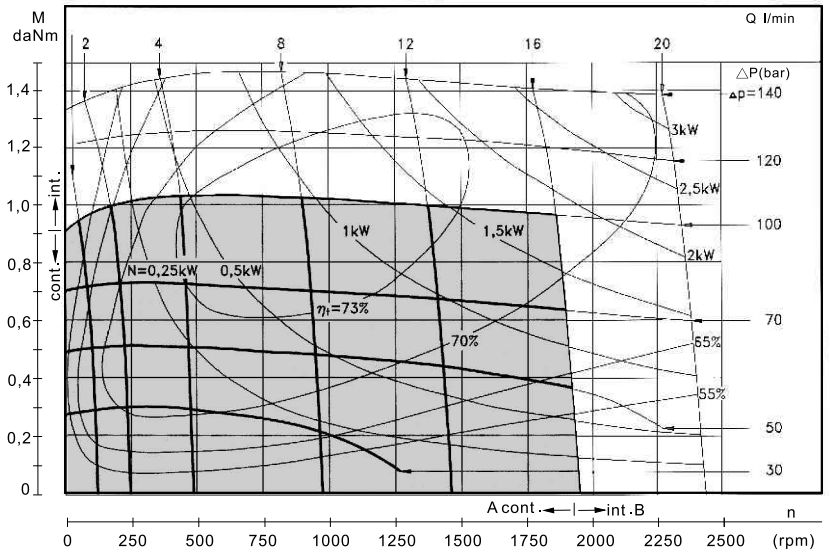
TYPE		MAMM 8	MAMM 12.5	MAMM 20	MAMM 32	MAMM 40	MAMM 50
Displacement (c.c/rev)		8.2	12.9	19.9	31.6	39.8	50.3
Max. speed (rpm)	Cont	1950	1550	1000	630	500	400
	Int(3)	2450	1940	1250	800	630	500
Max. Torque (da Nm)	Cont	1.1	1.6	2.5	4.1	4.2	4.6
	Int(3)	1.5	2.3	3.5	5.7	5.8	5.9
	Peak(4)	2.1	3.3	5.1	6.4	6.6	8
Max. output (Kw)	Cont	1.8	2.4	2.4	2.4	1.8	1.8
	Int(3)	2.6	3.2	3.2	3.2	3.0	2.1
Max. pressure drop (bar)	Cont	100	100	100	100	80	70
	Int(3)	140	140	140	140	110	90
	Peak(4)	200	200	200	200	140	125
Max.oil flow (l/min)	Cont	16	20	20	20	20	20
	Int(3)	20	25	25	25	25	25
Max. Inlet pressure (bar)	Cont	140	140	140	140	140	140
	Int(3)	175	175	175	175	175	175
	Peak(4)	225	225	225	225	225	225
Weight (kg)		1.9	2	2.1	2.2	2.3	2.4

(3) Intermittent operation rating applies to 6 sec. of every minute
(4) Peak load rating applies to 0.6 sec of every minute

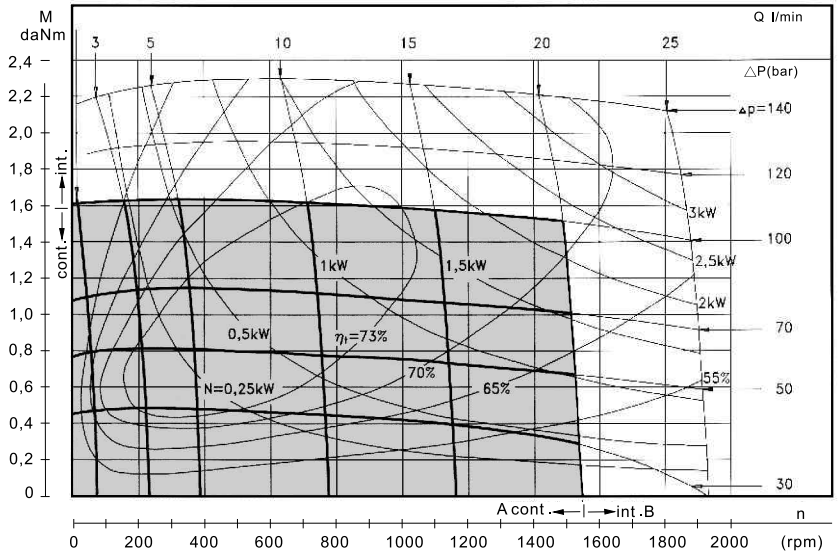
TYPE		MAMM 8	MAMM 12.5	MAMM 20	MAMM 32	MAMM 40	MAMM 50
Displacement (in.3/r)		0.5	0.79	1.21	1.93	2.43	3.07
Max. speed (rpm)	Cont	1950	1550	1000	630	500	400
	Int(3)	2450	1940	1250	800	630	500
Max. Torque (lb-in)	Cont	102	145	225	367	375	407
	Int(3)	133	204	310	504	513	522
	Peak(4)	186	292	453	566	584	708
Max. output (hp)	Cont	2.4	3.2	3.2	3.2	2.4	2.5
	Int(3)	3.5	4.3	4.3	4.3	4.0	2.8
Max. pressure drop (psi)	Cont	1430	1430	1430	1430	1200	1015
	Int(3)	2030	2030	2030	2030	1600	1300
	Peak(4)	2900	2900	2900	2900	2000	1815
Max.oil flow (gpm)	Cont	4.2	5.5	5.5	5.5	5.5	5.5
	Int(3)	5.5	6.6	6.6	6.6	6.6	6.6
Max. Inlet pressure (psi)	Cont	2030	2030	2030	2030	2030	2030
	Int(3)	2540	2540	2540	2540	2540	2540
	Peak(4)	3260	3260	3260	3260	3260	3260
Weight (lbs)		4.2	4.4	4.7	4.9	5.1	5.3

A：Continuous operation
B：Intermittent operation rating applies to 6 sec. of every minute.

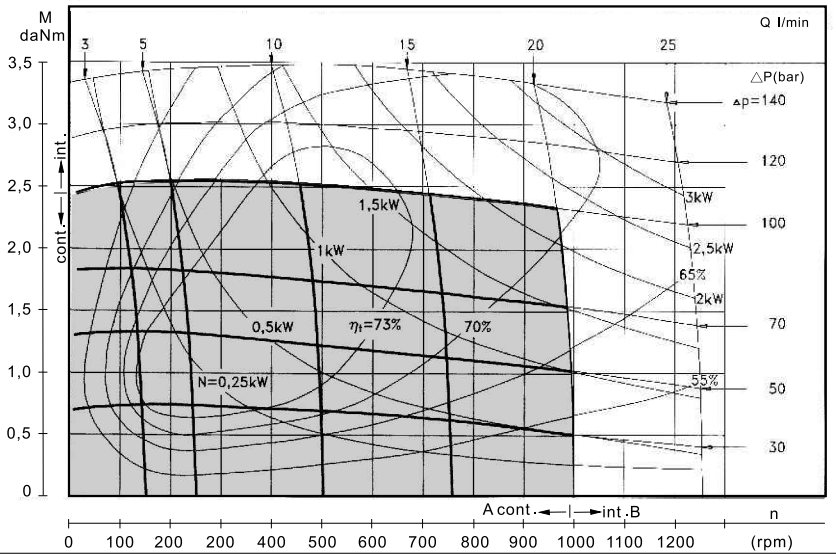
MAMM8



MAMM12.5

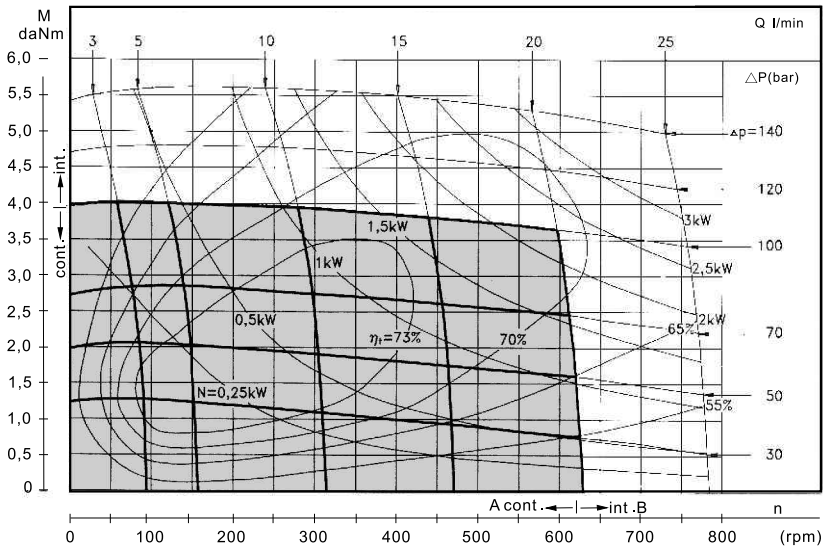


MAMM20

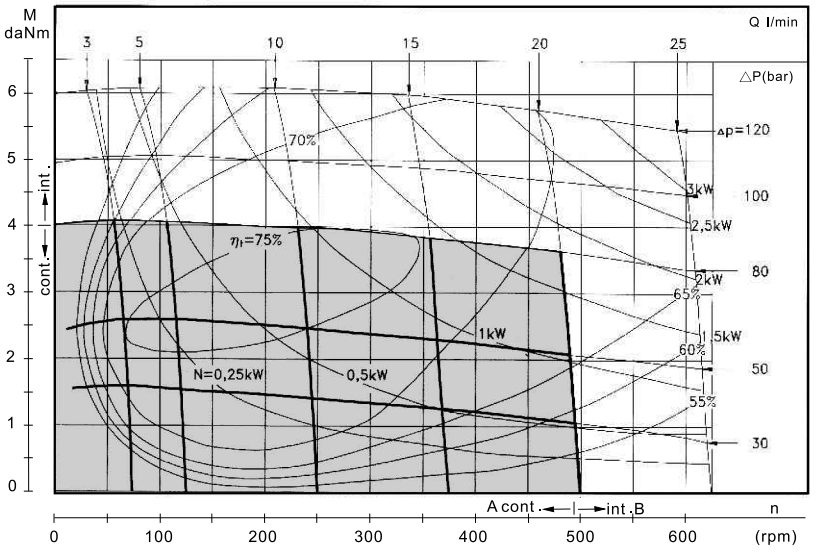


A : Continuous operation
B : Intermittent operation rating applies to 6 sec. of every minute.

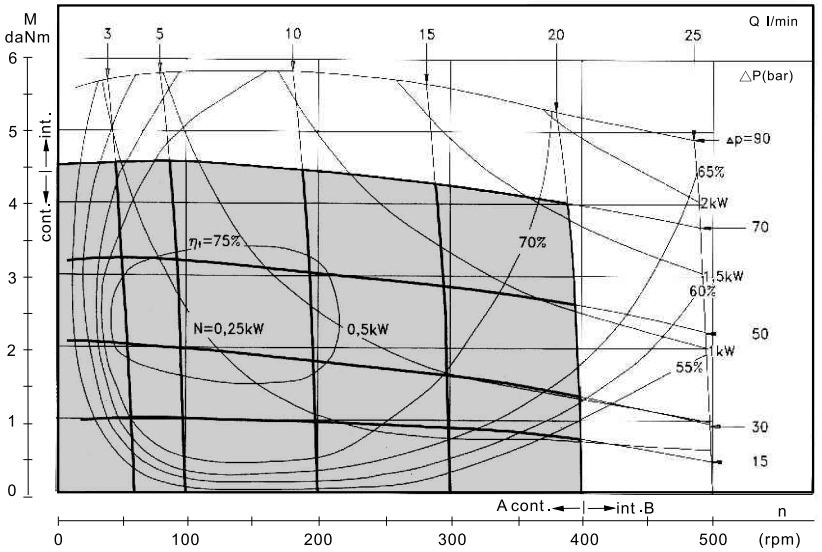
MAMM32



MAMM40

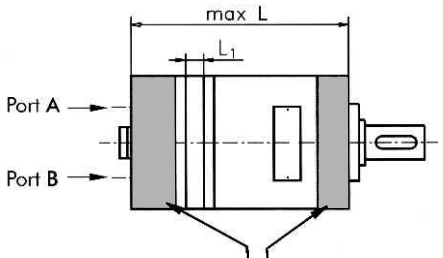


MAMM50



Dimensions and Mounting Data

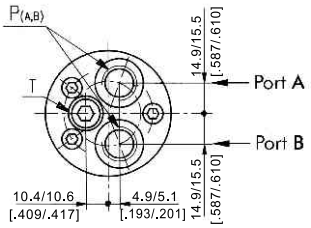
[inch] show in brackets [ ]



Porting

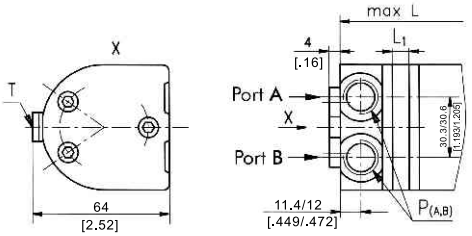
Rear Ports

Versions G M U



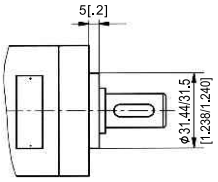
S Side Ports

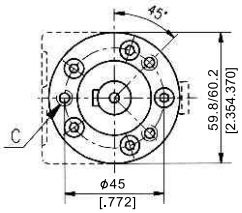
Versions G M U



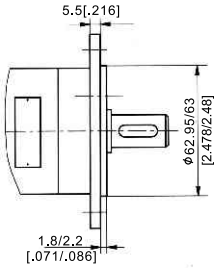
Mounting

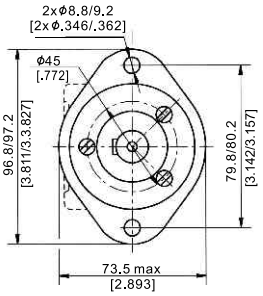
Round Flange(Three Bolts Mount)



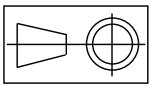


F Oval Mount (2 holes)





Code / Port	Versions		
	Omit	M	U
P(A,B)	2 x G 3/8	2 x M18 x 1.5	2 x 9/16 -18UNF
T	G 1/8	M10 x1	3/8 -24UNF
C	3 x M6-10	3 x M6-10	3 x 1/4 -28UNC

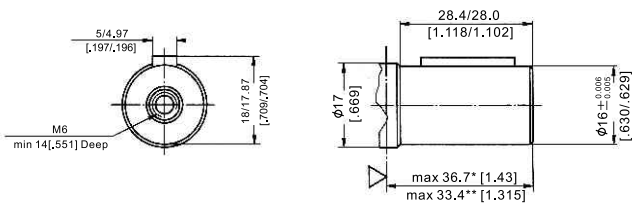


Type	Side Ports Lmax, mm[in]	Rear Ports Lmax, mm[in]	Type	Side Ports Lmax, mm[in]	Rear Ports Lmax, mm[in]	L1 mm[in]
MAMM 8	105[4.134]	104[4.094]	MAMMF 8	109[4.291]	107[4.213]	3.5[0.138]
MAMM 12.5	107[4.213]	106[4.173]	MAMMF 12.5	111[4.370]	109[4.291]	5.5[0.217]
MAMM 20	110[4.331]	109[4.291]	MAMMF 20	114[4.488]	112[4.409]	8.5[0.335]
MAMM 32	115[4.528]	114[4.488]	MAMMF 32	119[4.685]	117[4.606]	13.5[0.531]
MAMM 40	118[4.646]	117[4.606]	MAMMF 40	122[4.803]	120[4.724]	17.0[0.669]
MAMM 50	123[4.843]	122[4.803]	MAMMF 50	127[5.000]	125[4.921]	21.5[0.827]

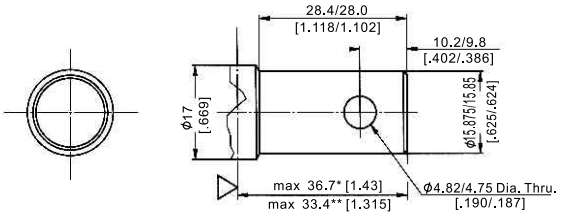
Shaft Extensions for MAMM Motor

[inch] show in brackets [ ]

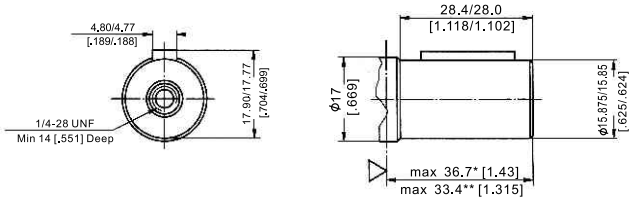
C ϕ16 straight, Parallel key 5 x 5 x16
Max. Torque 345 in-lb [3.9daNm]



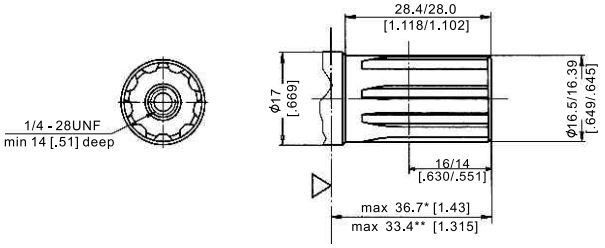
H 5/8" [15.8] straight, w/4.82[.19] Crosshole
Max. Torque 345 in-lb [3.9daNm]



CO 5/8" [15.8] straight, Parallel key 3/16" x 3/16" x 3/4"
Max. Torque 345 in-lb [3.9daNm]

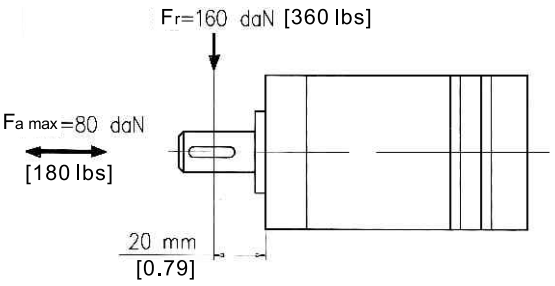


S ϕ 16.5 Splined B17 x 14
Max. Torque 390 in-lb [4.4daNm]



▽ - Motor Mounting Surface
* - For Round Flange
** - For F Flange

Permissible Shaft Loads For MAMM Motors



The permissible radial shaft load [Prad] is caculated from the distance [L] between the point load application and the mounting surface:

$$F_{rad} = \frac{600}{n} \times \frac{13040}{61.5 + L}\ , [daN]$$

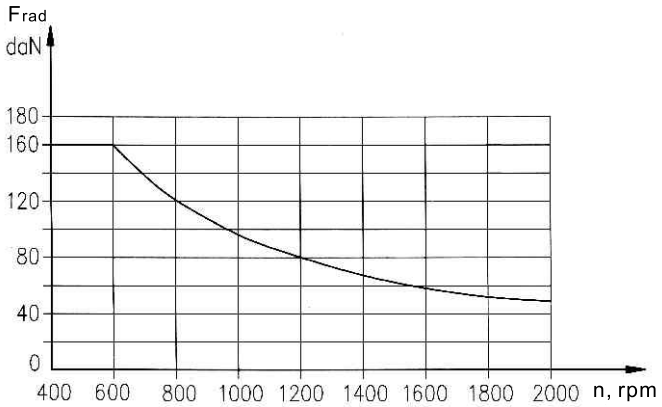
L in mm ; L≤80

$$F_{rad} = \frac{600}{n} \times \frac{1155}{2.42 + L}\ , [lbs]$$

L in inch; L≤3.12

The drawing shows the permissible radial load when L=20mm [0.79]

If the calculated shaft load exceeds the permissible, a flexible coupling must be used.



Hydraulic motor
Series MAMM Ordering Information

	1	2	3	4	5	6	7	8
MAMM								

Pos.1 Mounting Flange

Omit - Round Flange (Three bolts mount)

F Oval mount, two holes

Pos.2 Port Type

Omit - Rear Port

S Side Port

Pos.3 Displacement Code

8 - 8.2cc/0.5 [in.3/r] (not available)

12.5 - 12.9cc/0.79 [in.3/r] (not available)

20 - 20.0cc/1.21 [in.3/r]

32 - 31.8cc/1.93 [in.3/r]

40 - 40.0cc/2.43 [in.3/r]

50 - 50.0cc/3.07 [in.3/r]

Pos.4 Shaft Extensions

C - ϕ16 straight, Parallel key 5 x 5 x 16

CO - 5/8" [15.8] straight, Parallel key 3/16" x 3/16" x 3/4"

S - ϕ16.5 Splined B17 x 14

H - 5/8" [15.8] straight, w/4.82 [.19] Crosshole

Pos.5 Porting

Omit - 2 x G3/8, G1/8, BSP thread

M - 2 x M18x1.5; M10x1; metric thread

U - 2 x 9/16-18 UNF, O-ring, 3/8-24 UNF

Pos.6 Painting

Omit - Grey

B - Black

00 - No Paint

Pos.7 Rotation

Omit - Standard Rotation

R - Reverse Rotation

Pos.8 Design Series

Omit - Factory Specified